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AUTHOR	Wuellner, Lance
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ABSTRACT

The effect of a high-opportunity (HO) versus a low-opportunity (LO) play environment on the aggression of preschool children was investigated, hypothesizing that the LO play environment will elicit significantly more aggression than the HO play environment. The two environments were presented randomly to one group of 10 4-year-olds, five of each sex, on 12 consecutive 15-minute play sessions, with the stipulation that each environment be presented six times. There was no pre-experimental familiarization period due to information, later proven incorrect, that the subjects were adequately familiar with all the play apparatus. Results indicate that the high-level aggression in the first two LO sessions is solely responsible for the significant difference between the aggression in the LO versus the HO environments. Anecdotal records indicate that this high-level aggression can be attributed to a novel piece of equipment, a rocker, resulting in a recommendation for further study of the relation between novelty and aggression. The discussion identifies some factors relevant in the aggression education of young children. The design of similar studies using subjects who would presumably exhibit high-level aggression in high-opportunity environments is recommended. (Author/NH)

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THE EFFECT ON AGGRESSION OF VARIATION IN AMOUNT OF OPPORTUNITY FOR PLAY[1]

(Internal Report)
Lance Wuellner

The physical environment seems to play a crucial role in eliciting aggression. Johnson (1935) investigated the effect on behavior of variation in amount of play equipment. Her results indicated a greater incidence of aggression with less equipment. However, less equipment promoted an increase in social interaction in general.

Attempting a partial but more controlled replication of Johnson's study, the present study investigated the effect of a high-opportunity (HO) versus a low-opportunity (LO) play environment on the aggressive behavior of preschool children. It was hypothesized that the LO play environment would elicit significantly more aggression than the HO play environment.

Procedure

Both environments consisted of four separate areas--a trestle, a stool, a rocker, and some boxes. The LO environment consisted of a small four-foot-high trestle, a single three-and-a-half-foot-high stool, a two-capacity rocker, and two connected yard-square boxes. The HO environment consisted of a larger five-foot-high trestle with a nine-foot ladder attached, the same stool with a nine-foot balance beam and six-foot plank attached, a four-capacity rocker, and five connected yard-square boxes. The two rockers were considered particularly desirable for their respective environments since previous observation had indicated frequent one-child use of the two-seater (by sitting in the middle)

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and six-child use of the four-seater (by crowding). For both environments the four areas were first randomly placed in the quadrants of the room and then rotated clockwise before each experimental session.

The two environments were presented in random order to a group of ten four-year-olds,[2] five of each sex, on twelve consecutive play sessions, with the stipulation that each environment be presented six times. Each play session was fifteen minutes long. The beginning day was also randomly chosen to help control possible bias due to two intervening weekends. The schedule of presentation is shown in Figure 1.

Original plans included three familiarization sessions. The familiarization environment was to be a composite of the LO and HO environments, both rockers included. However, there was no pre-experimental familiarization period because it was assumed at the time that the subjects were adequately familiar with all the pieces of equipment. The decision not to do so was based on inadequate information as to what the children had been exposed to in the playroom thus far.

Observations of aggression were made simultaneously during each of the twelve sessions by the author and two naive observers.[3] All observers were stationed behind a semi-permanent observation wall installed along one side of an indoor playroom. The wall is composed of one-way windows at one-and-a-half-foot intervals. The room is approximately 21 feet square with this wall installed. The subjects had been adequately familiarized with this wall and payed no attention to it, the familiarization being due to the daily previous use of the room by the subjects for about eight weeks.

Recording sheets were divided into five-second cells. A tape loop that clicked every five seconds indicated when to move to the next cell. A check was scored in any cell during which aggression was observed among the children.

Aggression was defined according to Patterson, Littman and Bricker (1967), composed of either physical or verbal responses. Physical aggression included bodily or object contact such as hitting, pushing, kicking, jumping on, grabbing and attacking with an object. Verbal aggression included threatening (I'll hit you."), derogation (name-calling), assertive demands ("You better leave."), and threatening gestures (waving a fist or an object).

There were four practice sessions prior to experimentation. These sessions were used to practice recording, with the observers discussing the events observed.

While research practice does not favor recording in the direction of the dependent variable when its occurrence is in doubt, the circumstances of the present study made it evident that it was irrelevant as to which direction to score doubtful aggression. Scoring in one direction would produce overall artificially high aggression scores while scoring in the other direction would produce overall artificially low aggression scores. However, it was not the overall occurrence of aggression that was critical; it was the differences between the aggression scores of the LO versus the HO environments. Scores in both cases would be artificially biased; however, the differences would be relatively real and constant.

Due to the short observer training period, only the occurrence of aggression was scored in the appropriate cells. No attempt was made to

score other admittedly critical variables such as length, type and intensity of aggression as well as each subject's role as aggressor or victim or both.

Reliability

Observer reliability was not computed for the practice sessions but was calculated after data collection. Reliability measures included Kendall's coefficient of concordance (W), the average rank order correlation between any observer pair over all sessions (Rho_{ave}), and phi coefficients of correlation between each observer pair for each session. The observations of one of the two naive observers were rejected due to her absence from one practice and three experimental sessions, and to the lower reliability of her observations.

Kendall's coefficient of concordance was significant for all three observers as well as for the two remaining observers ($W = .80$, $F = 8.00$, $df = 8 \& 16$, $p < .01$; and $W = .88$, $F = 7.33$, $df = 10 \& 10$, $p < .01$, respectively). The average rank order correlation ($Rho_{ave} = kW-1/k-1$, where k = number of observers) was high in both cases ($Rho_{ave} = .70$, $k = 3$; and $Rho = .76$, $k = 2$). (It should be pointed out that for $k = 2$, Rho is not an average but actually is the rank order correlation.)

Phi coefficients of correlation calculated between the deleted observer and the other two in turn indicated satisfactory significance[3] for only about one-half of the experiental sessions. The phi coefficients between the two remaining observers were satisfactorily significant in every session but the last one.

Analysis

The scores of the two remaining observers were averaged to obtain an overall aggression score for each session. These overall scores are plotted in Figure 1. Each score represents the number of five-second intervals out of 60 (15 minutes) during which aggression occurred. The high incidence of aggression in the first two sessions is immediately noticed, as well as the relatively equal and low aggression scores in the remaining sessions.

A one-way analysis of variance over all twelve sessions indicated a significant difference ($F = 32.49$, $df = 1 \& 10$, $p < .01$) between the aggression in the LO versus the HO environments. However, a second analysis of variance with the first two sessions deleted indicated nonsignificance.

Brief anecdotal records taken at each session indicated that practically all the aggression occurring during these first two sessions (both contained LO environments) was due to the two-capacity rocker. The assumption that the children were adequately familiar with all the equipment seemed erroneous.

During the first session the children were quite excited by this rocker. One girl got in it to use by herself and refused to get out. Extensive aggression was exhibited in attempts to remove the girl from the rocker.

During the second session the children decided as a group that they should take turns in the rocker. A girl was given the first turn. However, no decision was made as to how long a turn should be. Extensive

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aggression was again exhibited in attempts to remove this girl from the rocker. It is interesting to note that the girl involved in the first session avoided the rocker during this second session.

Discussion

It can be stated rather concretely that the aggression due to the rocker in these first two sessions can be attributed to the novelty of the rocker. That a novel object instigates aggression due to competition for its use should not be surprising. It is recommended that a more carefully controlled study be conducted to test this specific question relating novelty to aggression.

The two-capacity rocker was not present during the third session. While it was present during the fourth session, the anecdotal records showed that it did not instigate much aggression at all; in fact, the total aggression exhibited during this session was at a low level (Figure 1). It can be assumed, and later sessions and their accounts indicate this, that the children had become adequately familiarized with the rocker to the extent that other apparatus could be satisfactorily used in lieu of the rocker. This is what happened. Aggression in the latter sessions was due primarily to equipment other than the rocker; that due to the rocker was very slight.

There could be justification to delete the first two sessions as familiarization sessions. With this done there would be no significant difference between the LO and HO environments, as indicated above.

The explanation for this result perhaps lies in the specific characteristics of the subjects in question. The nursery school at

the Children's Research Center as well as the familial background of the subjects are indicative of a non-aggression environment in which these children have been raised. Most of the children come from families in which at least one parent is affiliated with the University of Illinois, either as faculty or student. Other children have parents in the middle-class income bracket.

The characteristics of such a familial background point to two factors that may result in what might be called a high-aggression threshold: (1) negative reinforcement of aggression combined with adequate explanation for its non-use, and (2) positive reinforcement of cooperation.

Middle-class children, especially those of university-affiliated parents, seem to have relatively less contact with aggressive situations. This indicates less opportunity for aggression education, particularly in the area of refinement of aggressive responses as well as actual "practice."

Aggression that does occur in these children is often met with the kind of negative reinforcement that offers non-aggression as a highly suitable alternative. In other words, the aggression is not as likely to be repressed by more aggression combined with a lack of explanation as to its unsuitability. A more psychological approach is used. The child who aggresses receives adequate explanation of the inappropriateness of his behavior, expecially in terms of its deleterious effect on "important others."

Cooperative behavior is not only positively reinforced in this context but in every situation, especially those in which cooperation

has been originated by the child. It is not so much that aggression receives considerable attention, even if negatively, because this can be an adequate positive reinforcer; it is that suitable alternatives receive attention as well as practice by the parents themselves.

Important in aggression education is the observation of aggressive behavior in important others. The children of the present study have relatively little opportunity for such observation. Cooperation, on the other hand, is very frequent; and these children have ample opportunity to develop refinement of cooperative behaviors.

A nursery school is a very suitable environment for cooperation education. Cooperation is continually reinforced by the teachers and the peer group to the point where the aggressive child often feels guilty about causing disturbances which may disrupt the ongoing activities he and his peers are participating in.

It must be realized that these children have nevertheless received aggression education. They realize however that aggression can be avoided in many situations and replaced by alternative behavior more amenable to everyone involved. Aggression is thus seen as more of an extremist kind of behavior, a last resort when all else fails. In terms of cooperation, these children "try a little harder." Their aggression threshold is higher; in other words, it takes more to arouse them to aggression.

In the LO environment of the present study, the children perhaps became aware of a situation that would require much cooperation. A new toy was seen which everyone was interested in. The first session

indicated to everyone that each child had an interest in this new toy. By the second session they had decided to take turns, a remarkable example of cooperative refinement in a group of four-year-olds. It was only their inability to consider the length of turns during this second session which led to their demise.

The increasing familiarity of the new rocker as well as possible decisions on the part of individual children to "wait their turn" were possibly influential in reducing aggression in later LO sessions. The rocker was either infrequently used during these later LO sessions, or one or two children were able to use it an entire session with no disruption. The fact that the high-capacity rocker in the HO sessions was always in use by several children points to their continual desire to play in such movable equipment, possibly due to its "high stimulus feedback" with relatively low energy input, as well as to its high opportunity for fantasy (such as a boat). It seems that the relatively infrequent use of the novel rocker in later LO sessions could be due to the children's realization of the aggression-evoking potential of the rocker and their subsequent desire to limit their use of it, irregardless of the difficulty of such a restraint.

While these may be a special group of children with high aggression threshold, they nevertheless have a "breaking point," as suggested by the first two sessions. In other words, it should be entirely feasible to construct LO and HO play environments that could show significant differences in aggression. However, there are extremes on both ends which would be impractical. Application is a critical consideration

in studies of the present type. The introduction of a single, simple object in a playroom to be used by a group of children merely to obtain a significant difference in aggression verges on the useless, as well as unethical.

It may be that children of the type used in the present study are of little concern. Critical concern would center around children who would have shown significantly more aggression in the LO over the HO environment of the present study (with adequate familiarization). Such a result having been found, the next question would involve how to re-program such children in the direction of cooperation.

Recommendations

Several recommendations can be made at this point which are relevant for future work concerned with the role of the physical environment and its relation to aggression:

1. Further definition of environmental factors critical in affecting the display of aggression.
2. The control or variation of such environmental factors in future experimental studies of the relation between the physical environment and aggression.
3. Further quantitative definition and measurement of aggression, including its types and intensities, relevant to the subjects in question, as well as their possible roles in the total aggression scene.
4. The design of studies which are concerned with environments and subjects of practical significance such as including those subjects who would exhibit high levels of aggression in supposedly high opportunity environments.

5. The development of re-programming techniques to shape individuals toward the substitution of non-aggressive responses for earlier aggressive responses.

The present study represents a meager beginning; however, it is hoped that it serves as an impetus to keep the momentum going as thought and subsequent action begin to realize the recommendations outlined above.

References

1. Johnson, M. W. The effect on behavior of variation in amount of play equipment. Child Development, 1935, 6, 56-68.

2. Patterson, G. R., Littman, R. A., & Bricker, W. Assertive behavior in children: A step toward a theory of aggression. Monographs of the Society for Research in Child Development, 1967, 32, No. 5.

Footnotes

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[2]The author wishes to thank the staff, parents, and children of the Children's Research Center Preschool for their cooperation. The Preschool is supported by a training grant in child psychology, HD 00244, from the National Institute of Child Health and Human Development.

[3]The author thanks Terry Retondo and James Rose for their help as observers.

[4]Due to the exploratory nature of the study, the author considered the .10 level as satisfactory significance.

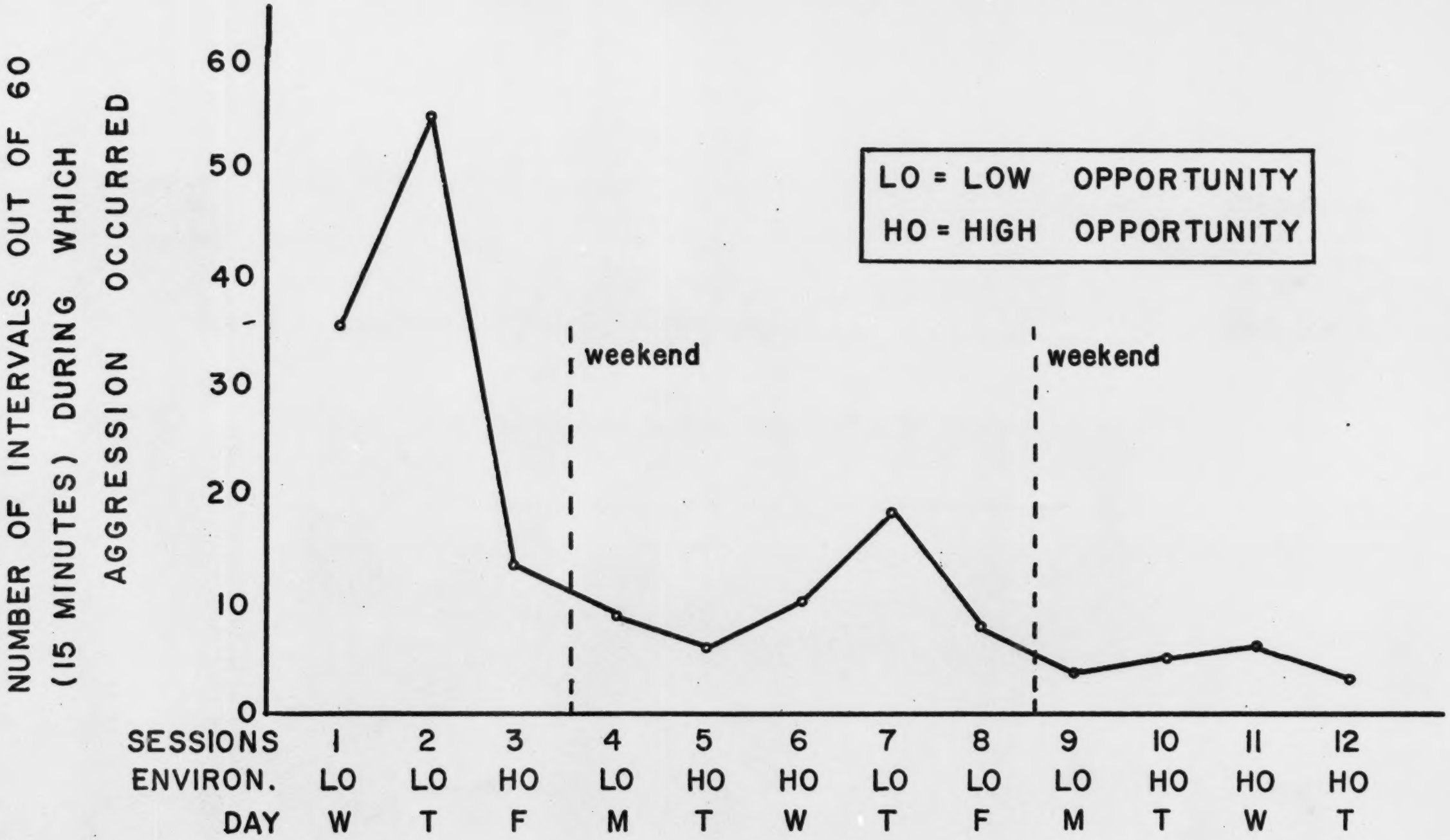
NUMBER OF INTERVALS OUT OF 60
(15 MINUTES) DURING WHICH
AGGRESSION OCCURRED
60
50
40
30
20
10
0
LO = LOW OPPORTUNITY
HO = HIGH OPPORTUNITY
weekend
weekend
SESSIONS 1 2 3 4 5 6 7 8 9 10 11 12
ENVIRON. LO LO HO LO HO HO LO LO LO HO HO HO
DAY W T F M T W T F M T W T

FIGURE 1

AMOUNT OF AGGRESSION RELATIVE TO LO AND HO PLAY ENVIRONMENTS OVER CONSECUTIVE SESSIONS